

to convince arachnologists that the inconstancy of a generic character is no reason for not relying upon it, his plan evidently being to regard as monstrosities all specimens which do not answer to the generic diagnosis.

On the Influence of the Marine Currents in the Geographical Distribution of the Amphibious Mammalia, and particularly of the Eared Seals. By M. E. L. TROUËSSART.

In a memoir recently presented to the Academy Prof. Milne-Edwards has demonstrated the influence of the antarctic currents on the geographical distribution of the Penguins. By applying the same laws to the class Mammalia, and more particularly to the group of the Otaries (or seals with external ears), which have a mode of life analogous to that of the penguins, I have arrived at some very important results, which confirm, in the most complete manner, the views put forward by M. Milne-Edwards.

The Eared Seals, in the present geological epoch, seem, like the penguins, to be native to the Antarctic lands, whence they have spread towards the north. Carried by the blocks of ice which the regular currents detach every year from the great southern glacier, these animals have colonized the shores of Cape Horn, the Falkland Isles, the Cape of Good Hope, Kerguelen Island, New Zealand, and Australia—in one word, all lands situated in the south of the New and the Old Worlds. Humboldt's current, in the west, has carried them, like the penguins, as far as the Galapagos Islands, under the equator; but while this extreme limit has not been passed by the penguins, the eared seals, on the contrary, have penetrated into the northern hemisphere. They are found on the shores of California and in the north of the Pacific Ocean; but they have certainly not arrived there by the direct route; for these animals are absolutely unknown on the west coast of America, from Peru to the north of Mexico—a stretch of more than 20 degrees; and, besides, *the Otaries of the Galapagos Islands and those of California belong not only to different species, but to different genera.*

This peculiarity seems at first sight inexplicable; but if we note on a good map of marine currents, and according to the method introduced by M. Milne-Edwards, all the stations where eared seals have been observed, we can easily explain the route followed by these animals before reaching the northern part of the Pacific. It is not the too great temperature of the tropical regions, as might be supposed, but the *presence of contrary currents*, that has banished them from these regions.

The equatorial current of the Pacific Ocean north of the Galapagos Islands, and that of the Atlantic north of the Falkland Islands, are directed precisely in opposition to the migrations of the Otaries. Those of these animals which, having reached the island of Tristan d'Acunha, have then tried to gain the western coast of Africa, have been seized by this current and driven to the west, onto the coast of Patagonia.

Those which have taken up their abode at the Cape of Good Hope have never been able to come up along the eastern coast of the continent, on account of the Mozambique current, which drove them back incessantly towards the south. It is this that explains why the eared seals are wanting in all the Atlantic Ocean north of the Falkland Islands, as well as in the whole western region of the Indian Ocean. Thus there remains only the *eastern* part of this latter ocean; and it is evidently by this route that the migration under consideration was accomplished. Having arrived, as already stated, on the southern shores of Australia, the Otaries have come up gradually on the western coast of that continent, which they still inhabit at the present day. In the north they have arrived as far as Melville Island, off the coasts of Port Essington, where at least two species of this family are to be found.

We know that a secondary current, the direction of which is determined by that of the *monsoon*, puts the Indian Ocean in communication with the Chinese Sea. From April until October, *exactly at the time when the eared seals come up towards the north*, this current is directed towards the north-east and flows into the great basin of the Pacific. This current must have singularly facilitated the migrations of the Otaries, which have been performed through the passages of the Molucca Sea, or by the much broader and deeper course of the Straits of Macassar. Once in the Chinese Sea, these animals gained the coast of Japan; thence, with the help of the great current of Tesson (the *Kur-Sivo*, or "*black river*," of the Japanese), they make the tour of the North Pacific Ocean, following the shores of Kamtschatka, of the Aleutian Islands, and North America, arriving finally at the south of California, which is the extreme limit of this vast circuit.

The proof of this migration is furnished us by the genus *Zalophus*, which still occurs on both sides of the equator—namely at Melville Island, on the coasts of Japan, on those of California, and throughout the northern part of the Pacific Ocean.

Considerations of the same kind may apply to the dispersion of the true seals, which are almost exclusively quartered in the northern hemisphere.

Thus a species of the genus *Pelagius* (or *Monachus*) has recently been met with in the West-Indian Sea. Now hitherto this genus has been considered peculiar to the Mediterranean; but we know that the monk-seal (*Pelagius monachus*), the only species formerly known, has passed through the Straits of Gibraltar; it occurs on the north-west coast of Africa, and as far as Madeira and the Canary Islands. It is probable that some individuals of this species, having been seized on these coasts by the equatorial current which completes the circuit of the Gulf-stream, have been carried to the west as far as the West-Indian Sea, where they have constituted a new form (*Pelagius tropicalis*, Gill).

The geographical distribution of the sea-elephants (*Macrorhinus*), is more difficult to understand. It is the only true seal (comparable in this respect to *Zalophus*) which is found equally on both sides of

the equator. In opposition to the opinion of Mr. Allen* I do not think that the starting-point of this type (at least considering it in the present epoch) can be placed in the northern hemisphere; for it is only found there now at one point of the coast of California, while these animals abound on all the coasts of the southern hemisphere. It is much more probable that it is from the island of Juan Fernandez, one of their principal stations in the Southern Seas, that these seals sent forth their colonies as far as California, making a long *détour* by the west of the Pacific Ocean. The Humboldt current and then the equatorial current have carried them as far as the Marianne Islands, skirting all the archipelagoes of Polynesia. From the Marianne Islands this same current has carried them eastward to the Sandwich and Revillagigedo Islands and to the coasts of California, where they constitute a distinct race (*Macrorhinus angustirostris*), now almost entirely destroyed by the wholesale slaughter to which they have been subjected.—*Comptes Rendus*, May 9, 1881, p. 1118.

On the Zoological Affinities of Halysites. By A. E. VERRILL.

Of the so-called "tabulate corals" many genera have already had their zoological positions determined. Thus Agassiz, in 1847, ascertained the hydroid nature of *Millepora*; and his observations have been fully confirmed by Moseley and others. That *Pocillopora* and its allies, living and extinct, are true Madreporarian corals was shown by me in 1867. That *Favosites* and the related extinct genera are closely allied to the modern *Alveopora* and *Porites* was also demonstrated by me in 1872†. Moseley, while on the 'Challenger' Expedition, was fortunate in examining the animal of *Heliopora*. He proved that it belongs to the Aleyonaria, and referred to the same group various fossil genera, in some cases apparently without sufficient reason.

The affinities of the genus *Halysites*, the common "chain coral" of the Silurian, have hitherto been very doubtful. Within a few days Mr. H. T. Woodman has shown me a very remarkable specimen of this genus, in which the internal structure is beautifully preserved. In this example, which is a fragment several inches across, the large tubes contain twelve well-developed and regular septa extending to the centre. Their edges are slightly serrulate, and do not rise above the tubes. In other words, the structure is that of a true Madreporarian coral.

Mr. Woodman informs me that this specimen is a fragment from a large mass 8 to 10 feet across, and that "the larger part of the mass was like the common specimens, showing no rays; but here and there, in spots all over the face of the mass, the septa were as well preserved as in the fragment shown to you."—*Amer. Journ. Sci.*, June 1881.

* 'History of North-American Pinnipeds,' 1880, p. 751.

† *Amer. Journ. Sci.* iii. pp. 187-194.